UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/945,482	08/30/2001	Jong-Hoon Kang	29926/36989	5537

4743 7590 02/04/2004

MARSHALL, GERSTEIN & BORUN LLP
6300 SEARS TOWER
233 S. WACKER DRIVE
CHICAGO, IL 60606

EXAMINER	
YANG, CLARA I	
ART UNIT	**PAPER NUMBER**
2635	3

DATE MAILED: 02/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/945,482	KANG, JONG-HOON	
	Examiner	Art Unit	
	Clara Yang	2635	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 August 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6* is/are rejected.

7)☒ Claim(s) *1 and 5* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 August 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: Reference sign "370" in Figure 5. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

3. The abstract of the disclosure is objected to because the maximum length of 150 words has been exceeded. Correction is required. See MPEP § 608.01(b).

4. The disclosure is objected to because of the following informalities:

- Page 4, lines 1 - 3: The applicant teaches that "the reader 10 successively transmits a radio frequency signal determined by electromagnetic field strength defining a tag read range." However, the radio frequency signal and its electromagnetic field strength are actually determined by reader 10, and the tag read range is determined by the radio frequency signal's electromagnetic field strength.

Appropriate correction is required.

Claim Objections

5. Claims 1 and 5 are objected to because of the following informalities:

- It is unclear how electromagnetic field strength is able to determine a carrier signal since a carrier signal creates an electromagnetic field. Consequently, the Examiner interprets "a carrier signal determined by electromagnetic field strength defining a tag read range" (see Claim 1) to mean "a carrier signal that defines a tag read range". Furthermore, the Examiner interprets "wherein the carrier signal is

determined by electromagnetic field strength defining the tag read range" (see Claim 5) to mean "wherein the tag read range is defined by the electromagnetic field strength of the carrier signal".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 2 and 3 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,883,582 (Bowers et al.).

Referring to Claim 2, Bowers teaches an RFID tag 10, as illustrated in Fig. 1, that comprises: (a) antenna 12 having a resonant circuit that resonates at about 13.56 MHz (see Col. 4, lines 41 - 45 and 57 - 62) and (b) integrated circuit (IC) 14 electrically connected to antenna 12 (see Col. 4, lines 39 - 41).

Regarding Claim 3, Bowers imparts that IC 14 includes: (a) programmable memory 18 for storing identification data (see Col. 5, lines 11 - 30); and (b) timer circuit 19 for establishing a non-transmission period (see Col. 5, lines 35 - 52).

8. Claims 2 and 3 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,097,292 (Kelly et al.).

Referring to Claim 2, Kelly teaches an RFID tag 106, as shown in Fig. 3, having (a) antenna 300 and (b) application specific integrated circuit (ASIC) 302 electrically coupled to antenna 300 (see Col. 6, lines 13 - 17 and Col. 15, lines 55 - 63). Kelly discloses that target 104 (i.e., "reader") and tag 106 exchange data via RF signals 110 and 112 having a carrier frequency of 13.56 MHz (see Fig. 2 and Col. 5, lines 53 - 56). In addition, Kelly teaches that antenna 300 receives energy from target 104's 13.56 MHz signal and send two signals V_a 1302 and V_b 1304 to bridge rectifier 1300, which generates a DC output voltage to power tag 106 (see Fig. 13 and Col. 21, lines 9 - 15), thereby implying that antenna 300 is matched to a resonant frequency of 13.56 MHz.

Regarding Claim 3, ASIC 302 of Kelly's RFID tag 106, as shown in Fig. 8, has a digital subsystem 304 and an analog subsystem 306. Per Kelly, digital subsystem 304, as shown in Fig. 9, comprises (a) data memory 902 (see Col. 20, lines 9 - 11), (b) controller 308, and (c) clock circuit 930. Because Kelly teaches that controller 308 provides message generation and that RFID tag 106 waits a random time period prior to responding to a received "wakeup" message from target 104 (see Col. 6, lines 40 - 41; Col. 11, lines 20 - 26; and Col. 18, lines 52 - 54), it is inherent that controller 308 has a timer for generating a random wait period or non-transfer period prior to message transmission.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,986,570 (Black et al.).

Black's radio frequency identification (RFID) interrogator 10, as shown in Fig. 2, comprises (a) microcontroller 18 for generating a frequency that corresponds to the carrier frequency of the system and defines a tag read range (see Col. 3, lines 39 - 40 and 53 - 65). Here it is understood that microcontroller 18 and drivers 14 form a transmitting or transferring unit (see Col. 3, lines 39 - 47). Per Black, interrogator 10 is able to suppress its carrier signal (i.e., generate a non-transfer period) in order to detect the presence of transponders 20 and when data collisions are detected (see Col. 5, lines 24 - 42), thereby providing (b) a gap signal generator for suppressing the carrier signal. Still referring to Fig. 2, Black's interrogator 10 has a receiving unit formed by: (c) demodulator 14 or amplitude detector for detecting the amplitude of the received encoded data (see Col. 3, lines 61 - 67 and Col. 4, line 1); and (d) amplifier and filter 16 for filtering and amplifying the received encoded data (see Col. 4, lines 5 - 16). Black teaches that microcontroller 18 also functions as (e) a signal collision detector (see Col. 5, lines 35 - 37) and (f) a data decoder (see Col. 4, lines 16 - 20). Black's interrogator 10 further includes (g) series circuit 11 having an antenna coil (see Col. 3, lines 47 - 61). Black's interrogator 10 lacks a carrier signal amplifier for amplifying the carrier signal generated by microprocessor 18. However, the Examiner takes Official Notice that RFID interrogators having a carrier signal amplifier are well known. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Black's interrogator such that drivers 14 includes a carrier signal amplifier since such amplifier increases the carrier

signal's strength, thereby improving system reliability and enlarging the interrogator's tag read range.

11. Claims 4 - 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,535,109 (Mahdavi) in view of U.S. Patent No. 6,097,292 (Kelly et al.) and U.S. Patent No. 6,661,336 (Atkins et al.).

Referring to Claims 4 and 6, per Mahdavi, transponder systems include an interrogator or reader that transmits radio frequency (RF) pulses and a plurality of transponders that receive the RF pulses and respond with identification data in the form of a modulate RF carrier (see Col. 1, lines 13 - 25). Consequently, it is understood that Mahdavi's transponder is an RFID tag and that Mahdavi's reader transmits a carrier signal at a predetermined frequency. Mahdavi's method, as shown in Fig. 2, comprises the steps of: (a) a reader transmitting an interrogation signal burst or carrier signal; (b) the reader transmitting an End Of Burst (EOB) signal or first gap signal at time t1; (c) tags 1 and 2 entering the reader field at time t1, determining that the amplitude of the interrogation burst is modulated upon detecting the EOB at time t2, and transmitting a Request To Send (RTS) signal back to the reader after a random delay; (d) if a tag is outside of the reader's field of coverage, the reader transmitting another EOB signal at time t2 and waiting to receive an RTS signal; and (e) the reader receiving the RTS signal and determining if a valid RTS signal has been received. (See Col. 2, lines 15 - 25.) Because Mahdavi's tag is passive (see Fig. 6), it is inherent that Mahdavi's reader (f) determines that the tag is within the reader's read range when the reader receives an RTS signal from the tag. If the random delay generators of tags 1 and 2 happen to generate the same delay after the EOB signal at time t2, tags 1 and 2 will transmit their RTS signal at the same time, causing the reader to (g) detect a data collision (see Col. 2, lines 42 - 48). Since the reader fails to detect a valid RTS

signal due to the collision, the reader (h) continues the periodic EOB signal transmission until the random delays generated in the tags are different, as indicated in Fig. 3 at time t2 (see Col. 2, lines 48 - 52). If the reader receives a valid RTS at time t3 in Fig. 2 or time t4 in Fig. 3, the reader (i) transmits a Clear To Send (CTS) burst or second gap signal, causing tag 1 to transmit its data to the reader and tag 2 to refrain from sending its RTS signal (see Col. 2, lines 25 - 35). Per Mahdavi, tag 1 transmits its data upon receiving the CTS burst until receiving another EOB burst from the reader at time t4 in Fig. 2 or time t5 in Fig. 3 (see Col. 2, lines 35 - 41). Mahdavi, however, fails to teach the steps of (1) the reader verifying the tag's data format, (2) the reader rereading the tag's data if the tag's data format is invalid, and (3) the reader generating a gap signal to notify that the data transfer is complete, wherein the gap signal is shorter than the EOB signal.

In an analogous art, Kelly teaches a contactless data exchange system comprising of host computers, target RF terminals or readers, and a plurality of tags. Per Kelly, target 104 and tag 106 (see Figs. 1 and 2) exchange data via a half-duplex communication protocol (see Col. 5, lines 53 - 56); thus Kelly's target 104 must cease data transmission (or transmit a gap signal) to tag 106 in order for tag 106 to transmit its data. Kelly's method, as illustrated in Fig. 6B, includes: (a) target 504 transmitting a "wakeup" signal on a carrier frequency of 13.56 MHz at step 604 (see Col. 5, lines 54 - 56 and Col. 11, lines 14 - 16); (b) the target transmitting a gap signal in order to receive a "ping" signal from tags that are present in the RF field at step 606 (see Col. 11, lines 16 - 17); (c) tags 502 and 510 receiving the "wakeup" signal at steps 605 and 605A, generating a random wait period, and transmitting a "ping" signal after the random wait period has expired at steps 608 and 608A (see Col. 11, lines 20 - 30); (d) target 504 receiving the "ping" signal and determining if the "ping" signal is good at step 610 (see Col. 11, lines 32 - 37);

(e) if an incoherent "ping" signal is received due to collision, target 504 transmitting a "ponginvalid" signal to tags 502 and 510 at step 612, causing tags 502 and 510 to transmit another "ping" signal after another randomly generated wait period (see Col. 11, lines 39 - 52); and (f) if a recognizable "ping" signal is received, target 504 immediately transmitting a "pongvalid" signal at step 620, causing tag 502 to transmit an "imawake" signal at step 628 and any tag (i.e., tag 510) that has yet to transmit a "ping" signal due to its randomly generated wait period to remain silent at step 632 (see Col. 11, lines 53 - 64). As shown in Fig. 4B, Kelly's target periodically transmits a "wakeup" signal, which is followed by a gap signal while waiting for a tag's "ping" signal, if tags are outside the target's RF field (see Col. 10, lines 15 - 19). Per Kelly, an "imawake" signal includes a synchronizing character, a tag identification number, a pseudo-random number generated by the tag for authentication, a message, and a message authentication code (MAC), which is used to check for transmission errors and message authenticity (see Col. 10, lines 43 - 47 and Col. 14, lines 21 - 24 and 34 - 36). Kelly imparts that if an incorrect MAC is received from a tag, Host 102 causes the target to repeat the data exchange process enough times to rule out transmission error as the cause of the problem (see Col. 14, lines 37 - 52). Consequently, Kelly teaches the steps of (1) verifying a tag's data format and (2) rereading the tag's data if the tag's data format is invalid (see Col. 11, lines 65 - 67 and Col. 12, lines 1 - 15).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Mahdavi as taught by Kelly because the steps of verifying a tag's data format and rereading the tag's data if the tag's data format is invalid improve system reliability and security by detecting transmission errors and incorrect inputs.

In another analogous art, Atkins teaches a method for preventing data collision in an RFID system, as shown in Fig. 3, that comprises the following steps: (a) reader 10 transmitting a radio frequency (RF) reader signal or carrier signal at time t_0 (see Col. 5, lines 40 - 45 and Col. 7, lines 33 - 36); (b) a number of passive transponders (tag 1, tag, 2, and tag 3) receiving reader 10's signal, generating power from the reader signal, and executing a random wait cycle before transmitting a response (see Col. 5, lines 47 - 50 and 57 - 58); (c) reader 10 receiving a signal 20 from tag 1 at time t_1 and transmitting a mute instruction 21 (i.e., amplitude modulation) or first gap signal at time t_2 in order to mute tags 2 and 3 (see Col. 5, lines 58 - 67); (d) the other tags detecting the short gap or amplitude modulation and pausing their random wait timers (see Col. 6, lines 45 - 62); (e) reader 10 reading signal 20 of tag 1 (see Col. 6, lines 10 - 15); (f) reader 10 transmitting an acceptance instruction 22 or second gap signal at time t3 in order to notify that tag 1's signal has been successfully received and that tags 2 and 3 are to resume their random wait cycles (see Col. 4, lines 7 - 11 and Col. 6, lines 15 - 21). The process is then repeated for tags 2 and 3. Though Atkins teaches that mute instruction 21 is a short gap and that acceptance or disable/wakeup instruction 22 is a long gap (see Col. 5, lines 59 - 61 and Col. 6, lines 40 - 49), it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the acceptance instruction 22 such that it is shorter than mute instruction 21 since Atkins imparts that both instructions can take various forms and that in one form, acceptance instruction 22's duration is different from that of mute instruction 21 (see Col. 4, lines 1 - 18).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Mahdavi as taught by Atkins because the step

of generating a gap signal to notify that data transfer is complete reduces collisions by preventing the other tags from transmitting until the data from a first tag is properly read.

Regarding Claim 5, as shown in Fig. 6, Mahdavi's transponder or tag is passive and must be within an interrogator's read field, which is defined by the interrogator's effective radiated power and carrier frequency, in order to receive power for data transmission (see Col. 1, lines 13 - 21).

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- U.S. Patent No. 5,689,239 (Turner et al.): Turner teaches an identification system comprising an interrogator and a plurality of RFID labels or tags. Turner's interrogator 1 comprises a transmitter and a receiver, wherein the transmitter has a master oscillator 154 for generating interrogation signals and a transmitter power amplifier 155.

ॐ

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Clara Yang whose telephone number is (703) 305-4086. The examiner can normally be reached on 8:30 AM - 7:00 PM, Monday - Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Horabik can be reached on (703) 305-4704. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

CY
28 January 2004

BRIAN ZIMMERMAN
PRIMARY EXAMINER